

**What is claimed is:**

- 1           1.       A vacuum apparatus of an ion implantation system having  
2       an ion generator, comprising:  
3               a vacuum pump evacuating an interior of the ion generator;  
4               a vacuum line connected between the vacuum pump and the ion  
5       generator;  
6               at least one first type valve connected to the ion generator and the  
7       vacuum line for injecting an inert gas into the ion generator and the vacuum  
8       line to equalize internal and external pressures of the ion generator and the  
9       vacuum line and also to remove the air from the interior of the ion generator  
10      and the vacuum line, so that oxygen does not react with an inflammable  
11      impurity inside the ion generator and the vacuum line; and  
12              at least one second type valve connected to the ion generator for  
13      being closed or opened to maintain the pressure of the ion generator to a  
14      predetermined vacuum level.
- 1           2.       The apparatus as claimed in claim 1, wherein the first type  
2       valve is a solenoid valve.
- 1           3.       The apparatus as claimed in claim 1, wherein the inert gas is  
2       selected from the group consisting of an argon gas and a nitrogen gas.

1           4.       The apparatus as claimed in claim 1, wherein the  
2 inflammable impurity includes one or more of phosphorous, hydrogen and  
3 magnesium.

1           5.       The apparatus as claimed in claim 1, wherein the vacuum  
2 pump includes a turbo pump and a roughing pump.

1           6.       The apparatus as claimed in claim 1, wherein one of the at  
2 least one first type valve is directly connected to the ion generator, and any  
3 additional first type valves are arranged at locations adjacent to the vacuum  
4 pump.

1           7.       The apparatus as claimed in claim 5, wherein one of the at  
2 least one second type valve is directly connected to the ion generator, and  
3 any additional second type valves are arranged at locations adjacent to the  
4 vacuum pump.

1           8.       An evacuation method in an ion implantation system  
2 including an ion generator and a vacuum apparatus including a vacuum line,  
3 the method comprising:  
4           injecting an inert gas into the interior of the ion generator and the  
5 vacuum line to equalize internal and external pressures of the ion generator  
6 and the vacuum line;

7            opening the ion generator to clean the interior thereof or to replace a  
8            damaged part;  
9            closing the ion generator; and  
10           injecting the inert gas into the interior of the ion generator and the  
11           vacuum line to remove the air from the inside of the ion generator and the  
12           vacuum line, so that oxygen does not react with an inflammable impurity  
13           inside the ion generator and the vacuum line.

1            9.           The method as claimed in claim 8, wherein the inert gas is  
2            selected from the group consisting of an argon gas and a nitrogen gas.

1            10.          The method as claimed in claim 8, wherein the inflammable  
2            impurity includes phosphorus, hydrogen and magnesium.

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